Paper No. 11

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HUA CHING HSU

Appeal No. 2001-0379
Application No. 09/141,891

ON BRIEF

Before BARRETT, GROSS, and LEVY, Administrative Patent Judges.
LEVY, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1-7, 9, 11-18, 20-28, and 30, which are all of the claims pending in this application. Claims 8, 10, 19, and 29 have been canceled.

BACKGROUND

Appellant's invention relates to an apparatus and method for detecting flammable gas in a gas mixture. An understanding of the invention can be derived from a reading of exemplary claims 1 and 11, which are reproduced as follows:

1. An apparatus for detecting a flammable gas in a gas mixture comprising:

a chamber having an inlet, an outlet and a cavity contained therein, said cavity being equipped with an ignitor means and a temperature sensor,

an air pump having an inlet connected to the outlet of said chamber such that said inlet of the air pump is in fluid communication with the inlet of said chamber enabling a gas mixture to flow therethrough at a speed of not less than 5 meter/second, and

a valve means for shutting off said inlet to said chamber when said ignitor means ignites a flammable gas in said gas mixture and said temperature sensor senses a temperature rise of at least 10^{o}C.

11. A method for detecting a flammable gas in a gas mixture comprising the steps of:

providing a reactor chamber having an inlet, an outlet and a cavity contained therein,

positioning an ignitor means and a temperature sensor in said cavity,

flowing a gas mixture through said inlet of said reactor chamber into said cavity;

igniting said gas mixture by said ignitor means, and

stopping said gas mixture flow when said temperature sensor detects a temperature rise in said cavity.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Cox	3,913,600	Oct. 21, 1975
Kern	4,381,218	Apr. 26, 1983

Claims 1-7, 9, 11-18, 20-28, and 30 stand rejected under 35 U.S.C. § 103 as being unpatentable over Kern in view of Cox. Rather than reiterate the conflicting viewpoints advanced by the examiner and appellant regarding the above-noted rejection, we make reference to the examiner's answer (Paper No. 10, mailed June 16, 2000) for the examiner's complete reasoning in support of the rejection, and to appellant's brief (Paper No. 9, filed May 31, 2000) for appellant's arguments thereagainst. Only those arguments actually made by appellant have been considered in this decision. Arguments which appellant could have made but chose not to make in the brief have not been considered. See 37 CFR 1.192(a).

OPINION

In reaching our decision in this appeal, we have carefully considered the subject matter on appeal, the rejection advanced

by the examiner, and the evidence of obviousness relied upon by the examiner as support for the rejection. We have, likewise, reviewed and taken into consideration, in reaching our decision, appellant's arguments set forth in the brief along with the examiner's rationale in support of the rejection and arguments in rebuttal set forth in the examiner's answer.

Upon consideration of the record before us, we affirm-in-part.

In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the examiner to establish a factual basis to support the legal conclusion of obviousness. See In re Fine, 837 F.2d 1071, 1073, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). In so doing, the examiner is expected to make the factual determinations set forth in Graham v. John Deere Co., 383 U.S. 1, 17, 148 USPQ 459, 467 (1966), and to provide a reason why one having ordinary skill in the pertinent art would have been led to modify the prior art or to combine prior art references to arrive at the claimed invention. Such reason must stem from some teaching, suggestion or implication in the prior art as a whole or knowledge generally available to one having ordinary skill in the art. Uniroyal, Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins &

Refractories, Inc., 776 F.2d 281, 293, 227 USPQ 657, 664 (Fed. Cir. 1985); ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). These showings by the examiner are an essential part of complying with the burden of presenting a prima facie case of obviousness. Note In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). If that burden is met, the burden then shifts to the applicant to overcome the prima facie case with argument and/or evidence. Obviousness is then determined on the basis of the evidence as a whole. See id.; In re Hedges, 783 F.2d 1038, 1039, 228 USPQ 685, 686 (Fed. Cir. 1986); In re Piasecki, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984); and In re Rinehart, 531 F.2d 1048, 1052, 189 USPQ 143, 147 (CCPA 1976).

We begin with claim 1. The examiner's position (answer, page 3) is that Kern lacks employing the air pump at the outlet of the chamber, assuring a particular minimum air speed, and a temperature sensor to sense a temperature rise of at least 10˚C. To overcome this deficiency in Kern, the examiner turns to Cox for a teaching of using a temperature sensor to detect temperature increases up to 300˚C. In the examiner's opinion (id.), to place the pump upstream of the combustion chamber instead of downstream would be a mere matter of designing the

apparatus to suit particular design requirements. The examiner additionally asserts (id.) that it would be a matter of routine experimentation to arrive at any particular flow rate.

Appellant asserts (brief, page 8) that Cox does not teach an air pump that has an inlet connected to an outlet of a combustion chamber, and does not teach flowing a combustible gas through the chamber at a speed not less than 5 meter/second. It is further argued (brief, page 11) that neither reference teaches sensing a temperature rise of at least 10˚C by a temperature sensor when the flammable gas is ignited. Appellant further asserts (brief, page 12) that "the high flow speed of at least 5 meter/second of the gas mixture into a reaction chamber is what enables the present invention method to detect flammable gas in a very rapid manner. Such criticality of the present invention has been clearly shown by the Appellant and is clearly not a matter of routine experimentation to arrive at."

We observe at the outset that appellant does not argue the combinability of the references, but rather argues that the combined teachings of Kern and Cox would not result in the claimed invention. From our review of Kern and Cox, we find that neither reference teaches "an air pump having an inlet connected to the outlet of said chamber such that said inlet of the air

pump is in fluid communication with the inlet of said chamber enabling a gas mixture to flow therethrough at a speed of not less than 5 meter/second," as recited in claim 1. In addition, although we find that Cox teaches the use of a temperature sensor in an apparatus for monitoring and controlling the composition of potentially flammable gas mixtures (col. 1, lines 10-12, and col. 4, lines 5-11) we find that Cox does not teach sensing a temperature rise of at least 10˚C because switch 90 of Cox is calibrated to close on a sensed temperature rise of 300˚F (col. 4, lines 36-38)[1]. Thus, we find that neither Kern nor Cox discloses (a) an air pump having an inlet connected to the outlet of the chamber; (b) the air pump enabling a gas mixture to flow therethrough at a speed of not less than 5 meter/second, and (c) a temperature sensor that senses a temperature rise of at least 10˚C, all as recited in claim 1.

Beginning with (a), we find no suggestion in Kern or Cox for providing an air pump at the outlet of the chamber. Although Cox discloses pump assembly 18 for propelling a gas sample stream through the flammable gas tester (col. 2, lines 66-68), we find no suggestion of providing an air pump to be connected to the outlet of the chamber. We find the examiner's rationale (answer,

[1] We interpret "at least 10˚C" to mean a range of 10˚C and greater.

page 4) of "a mere matter of designing the apparatus to suit particular design requirements" to be a conclusionary statement unsupported by any evidence in the record.

With respect to (b), we find that appellant's specification discloses (pages 10 and 11) that:

> The present invention apparatus enables the detection of flammable gases in a very rapid manner, for instance, within a time period of 0.5 second such that the flow of the gas mixture can be shut-off immediately to avoid potential hazard of fire or explosion.. . . A gas mixture is fed into the reactor chamber at a high flow speed of at least 5 meter/second, preferably at a flow speed of at least 10 meter/second, and more preferably at a flow speed of at least 15 meter/second. The flow of the gas mixture into the reactor chamber is induced by a high speed air pump connected to and in fluid communication with a chamber cavity and a source of the gas mixture.

Appellant asserts (brief, page 9) that "[t]he Appellant respectfully submits that *the criticality of the present invention* of being able *to detect flammable gas in a very rapid manner* which is achieved *by flowing a gas mixture* into the reaction chamber *at a high flow speed of at least 5 meter/second* is not recognized by either Kern or Cox or in combination thereof, let alone a solution proposed to such problem." We agree. Although Kern discloses the use of a low pressure switch 51, it is disclosed that "[t]he low pressure switch 51 serves to

monitor the continued operation of the system with regard to a cessation of the sample flow stream due to plugging of the conduit 90 (col. 4, lines 41-45). We are not persuaded by the examiner's assertion (answer, page 4) that "[g]iven the teachings of Kern and Cox, to arrive at any particular desirable flow rate would be a matter of routine experimentation to arrive at an optimized flow rate." From our analysis of the teachings of Kern and Cox, supra, we find the examiner's reasoning to be speculation, unsupported by any evidence in the record.

With respect to (c), we do not agree with the examiner's assertion (answer, page 4) that in Cox, ignition is detected by a temperature sensor which detects temperature increases "up to 300˚C." We find that Cox discloses (col. 4, lines 36-38) that the temperature switch 90 closes on a sensed temperature rise to 300˚F, and that when the temperature in the combustion chamber and the temperature switch 90 drop to below 300˚F, after a suitable time delay, the switch 90 opens (col. 8, lines 53-57). From the disclosure of Cox, we find that the switch 90 closes when the temperature rises to 300˚F, and does not detect temperature increases up to 300˚F, as asserted by the examiner. In any event, we find no suggestion in either Kern or Cox that would have suggested sensing a temperature rise of at least

10˚C, as recited in claim 1. Moreover, we find the examiner's reliance on In re Aller, 220 F.2d 454, 105 USPQ 233 (CCPA 1955) to be misplaced, as the general conditions of the claim are not disclosed in the prior art.

From all of the above, we find that the examiner has failed to establish a prima facie case of obviousness of claim 1. Accordingly, the rejection of claim 1 and claims 2-7, and 9, dependent therefrom, is reversed.

We turn next to independent claim 11. We observe at the outset that the limitations which distinguished claim 1 from Kern and Cox, i.e., (a) an air pump having an inlet connected to the outlet of the chamber; (b) the air pump enabling a gas mixture to flow therethrough at a speed of not less than 5 meter/second, and (c) a temperature sensor that senses a temperature rise of at least 10˚C, do not appear in claim 11. We find that Cox discloses a method for detecting flammable gas in a gas mixture (col. 1, lines 7-12); providing a reactor chamber (48 and col. 4, line 42) having an inlet (80), an outlet (84) and a cavity (figure 1) contained therein; providing an ignitor means (86) and a temperature sensor (90) in the cavity; flowing a gas mixture through said inlet of said reactor chamber into said cavity (col. 7, lines 41-47); igniting said gas mixture by said ignitor means

(col. 8, lines 12-20); and stopping said gas mixture flow when said temperature sensor detects a temperature rise in said cavity (col. 8, lines 42-52). Thus, we affirm the obviousness rejection of claim 11 over Cox, with Kern being cumulative. We note that it is permissible to affirm a rejection relying on fewer references than applied in the rejection. See In re Bush, 296 F.2d 491, 496, 131 USPQ 263, 266-67 (CCPA 1961).

We turn next to claim 12. Both appellant (brief, page 11) and the examiner (answer, page 4) assert that neither reference employs a flow meter. Although not brought to our attention by either the appellant or the examiner, we find that Cox discloses flow meter 28 which meters non-combustible gas from container 16, which is delivered to tub 20 before being drawn out along with the combustible gas mixture by pump 182 and transmitted to the combustion chamber (col. 9, lines 7-17). Accordingly, the rejection of claim 12 under 35 U.S.C. § 103(a) is affirmed.

We turn next to claim 13. The claim recites that the gas mixture is ignited by an electronic ignition means. Both appellant and the examiner are silent as to this limitation. We find that Cox discloses a capacitor discharge power unit and ignition coil assembly 50, an electronic ignition trigger oscillator assembly (col. 3, lines 24 and 25). From Cox's

disclosure of an electronic ignition trigger oscillator assembly, we find that Cox teaches the claimed electronic ignition. Accordingly, the rejection of claim 13 under 35 U.S.C. § 103(a) is affirmed.

We turn next to claim 14. Claim 14 recites the step of "stopping said gas mixture flow by a solenoid valve and flowing ambient air into said cavity of the reactor chamber when said temperature sensor detects a temperature rise in said cavity." We find that in Cox, when a rise in temperature is sensed, the flow of the gas mixture to the reactor chamber is cut off, and the non-combustible supporting gas CO_2 flows into tub 20 (col. 8, lines 25-30). Thus, Cox does not disclose the flowing of ambient air into the cavity of the reactor in response to detection of a rise in temperature. We also find no disclosure in Kern of adding ambient air to the reactor chamber in response to a buildup of pressure in the cavity. Accordingly, we find that the examiner has failed to establish a prima facie case of obviousness of claim 14. The rejection of claim 14 under 35 U.S.C. § 103(a) is therefore reversed.

We turn next to claim 15. We affirm the rejection of claim 15 because Cox discloses the step of flowing a gas mixture

containing a flammable gas into said cavity and igniting the flammable gas by said ignitor means (col. 8, lines 13-24).

We turn next to claims 16-18 and 20. We reverse the rejection of these claims based on our earlier findings with respect to claim 1, supra. With regard to claim 17, we add that we find no suggestion in the prior art, and none has been provided by the examiner, for stopping the gas mixture in a time period of less than 0.5 second when the temperature sensor detects a temperature rise. Accordingly, the rejection of claims 16-18 and 20 under 35 U.S.C. § 103(a) is reversed.

We turn next to independent claim 21. We find that the prior art does not suggest the limitations of claim 21 because, as we found earlier with respect to claim 1, the prior art to Kern and Cox do not teach or suggest "a gas evacuation means in fluid communication with said gas outlet of the reactor chamber capable of withdrawing a gas mixture containing a flammable gas from said chamber at a flow speed of at least 5 meter/second." Accordingly, the rejection of claim 21 and claims 22-28 and 30, dependent therefrom, under 35 U.S.C. § 103(a) is reversed.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1-7, 9, 14, 16-18, 20, 21-28, and 30 under 35 U.S.C.

§ 103(a) is reversed. The decision of the examiner to reject claims 11-13 and 15 under 35 U.S.C. § 103(a) is affirmed. No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136 (a).

AFFIRMED-IN-PART

LEE E. BARRETT Administrative Patent Judge	)
ANITA PELLMAN GROSS Administrative Patent Judge	) BOARD OF PATENT APPEALS AND INTERFERENCES
STUART S. LEVY Administrative Patent Judge	)

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